Listing of Claims

Claim 1 (Previously Presented): A method of processing a command requesting information on any intermediate layer-2 devices present in a route from a first system to a second system, said any intermediate devices being contained in a network implemented on a broadcast medium, said network containing a plurality of devices including said any intermediate devices, said method comprising:

receiving said command in a receiving device;

sending a request packet from said receiving device to a present layer-2 device requesting information on whether said second system is connected directly to said present layer-2 device;

receiving by said receiving device a response packet from said present layer-2 device, wherein said response packet indicates whether said second system is connected directly to said present layer-2 device, wherein said response packet further identifies a subsequent layer-2 device in a route from said present layer-2 device to said second system if said second system is not connected directly to said present layer-2 device, wherein said subsequent layer-2 device is next to said present layer-2 device in said route to said second system; and

repeating by said receiving device said sending and receiving by using said subsequent layer-2 device in the place of said present layer-2 device until said response packet indicates that said second system is directly connected to said present layer-2 device.

Claim 2 (Currently Amended): The method of claim 1, wherein said response packet indicates that said receiving device is not ~~directly~~ connected directly to said first layer-2 device, said method further comprising ~~comprises~~:

locating a directly connected device which is connected directly to said first system;

using said directly connected device as said present layer-2 device, wherein said locating and said using are performed before said sending; and

performing said repeating in said receiving device to determine said route.

Claim 3 (Original): The method of claim 2, wherein said locating comprises:

substituting said receiving device as said first layer-2 device; and

performing said repeating to determine said directly connected device.

Claim 4 (Previously Presented): The method of claim 2, wherein said locating comprises sending a multicast packet directed to said plurality of devices, said multicast packet containing an identifier of said first system, wherein each of said plurality of devices is designed to respond indicating if said first system is connected directly to the device.

Claim 5 (Currently Amended): The method of claim 1, further comprising:

determining a first layer-2 device which is connected directly to said first system, logically viewing said first layer-2 device as a present layer-2 device if said second system is also not ~~directly~~ connected directly to said first layer-2 device;

wherein said determining is also performed by said receiving device.

Claim 6 (Original): The method of claim 5, further comprising providing a command line interface to enable a network administrator to enter said command on said receiving device.

Claim 7 (Previously Presented): The method of claim 1, wherein said second system is deemed to be directly connected to said first layer-2 device if said second system is connected to a port of said first layer-2 device.

Claim 8 (Original): The method of claim 7, further comprising:

receiving in said receiving device a neighbor packet from a neighbor device on at least one port; and

concluding in said receiving device that a system communicating on another port is connected directly to said another port by the absence of reception of neighbor packets on said another port.

Claim 9 (Original): The method of claim 8, wherein said network is implemented using Ethernet/802.3 protocol.

Claim 10 (Original): The method of claim 1, wherein said request packet and said response packet are generated consistent with UDP/IP protocol.

Claim 11 (Canceled)

Claim 12 (Previously Presented): A method of supporting the tracing of a route containing a sequence of layer-2 devices between a first system and a second system, said method being performed in a layer-2 device forming a part of a network, said method comprising:

receiving in said layer-2 device a request packet from a central device, said request packet containing an identifier for said second system, wherein said request packet requests information on whether said second system is connected directly to said layer-2 device;

determining in said layer-2 device whether said layer-2 device is connected directly to said second system;

identifying in said layer-2 device a next device if said layer-2 device is not connected directly to said second system, wherein said next device is next to said layer-2 device in a route from said first system to said second system;

generating in said layer-2 device a response packet, wherein said response packet indicates whether said second system is connected directly to said layer-2 device, said response packet including data identifying said next device if said second system is not connected directly to said layer-2 device; and

sending from said layer-2 device to said central device said response packet irrespective of whether said central device is in said route or whether said layer-2 device is a last device in said route,

whereby said central device uses said data identifying said next device to determine said sequence of layer-2 devices.

Claim 13 (Canceled)

Claim 14 (Previously Presented): The method of claim 12, wherein said identifying comprises:

examining a table in said layer-2 device to determine a port on which said second system communicates; and

locating a device connecting on said port, wherein said located device comprises said next device.

Claim 15 (Original): The method of claim 14, wherein said locating comprises:

receiving a neighbor packet from said next device on said port indicating a next device identifier identifying said next device; and

including said next device identifier in said response packet.

Claim 16 (Previously Presented): The method of claim 15, wherein said first system is deemed to be connected directly to said layer-2 device if said first system is present on a port of said layer-2 device, wherein determining is based on the absence of reception of said neighbor packet on said port.

Claim 17 (Previously Presented): An apparatus processing a command requesting information on any intermediate layer-2 devices present in a route from a first system to a second system, said any intermediate devices being contained in a network implemented on a broadcast medium, said network containing a plurality of devices including said any intermediate devices, said apparatus comprising:

means for receiving said command in a receiving device;

means for sending a request packet from said receiving device to a present layer-2 device requesting information on whether said second system is connected directly to said present layer-2 device;

means for receiving a response packet from said present layer-2 device, wherein said response packet indicates whether said second system is connected directly to said present layer-2 device, wherein said response packet further identifies a subsequent layer-2 device in a route from said present layer-2 device to said second system if said second system is not connected directly to said present layer-2 device, wherein said subsequent layer-2 device is next to said present layer-2 device in said route to said second system; and

means for repeating said sending and receiving by using said subsequent layer-2 device in the place of said present layer-2 device until said response packet indicates that said second system is directly connected to said present layer-2 device

wherein said means for receiving and said means for repeating are also contained in said receiving device.

Claim 18 (Currently Amended): The apparatus of claim 17, wherein said response packet indicates that said receiving device is not ~~directly~~ connected directly to said first layer-2 device, wherein said means for determining further comprises:

means for locating a directly connected device which is connected directly to said first system;

means for using said directly connected device as said present layer-2 device; and

means for performing said repeating to determine said route, said means for performing being contained in said receiving device.

Claim 19 (Previously Presented): The apparatus of claim 18, wherein said means for locating comprises:

means for substituting said receiving device as said first layer-2 device; and

means for performing said repeating to determine said directly connected device.

Claim 20 (Previously Presented): The apparatus of claim 18, wherein said means for locating comprises sending a multicast packet directed to said plurality of devices, said multicast packet containing an identifier of said first system, wherein each of said plurality of devices is designed to respond indicating if said first system is connected directly to the device.

Claim 21 (Previously Presented): A layer-2 device for supporting the tracing of a route containing a sequence of layer-2 devices between a first system and a second system, said layer-2 device being comprised in a network based on broadcast medium, said layer-2 device comprising:

means for receiving in said layer-2 device a request packet from a central device, said request packet containing an identifier for said second system, wherein said request packet requests information on whether said second system is connected directly to said layer-2 device;

means for determining in said layer-2 device whether said layer-2 device is connected directly to said second system;

means for identifying in said layer-2 device a next device if said layer-2 device is not connected directly to said second system, wherein said next device is next to said layer-2 device in a route from said first system to said second system;

means for generating in said layer-2 device a response packet, wherein said response packet indicates whether said second system is connected directly to said layer-2 device, said means for generating including data identifying said next device in said response packet if said second system is not connected directly to said layer-2 device; and

means for sending from said layer-2 device to said central device said response packet irrespective of whether said central device is in said route or whether said layer-2 device is a last device in said route,

whereby said central device uses said data identifying said next device to determine said sequence of layer-2 devices.

Claim 22 (Canceled)

Claim 23 (Previously Presented): The layer-2 device of claim 21, wherein said means for identifying comprises:

means for examining a table in said layer-2 device to determine a port on which said second system communicates; and

means for locating a device connecting on said port, wherein said located device comprises said next device.

Claim 24 (Previously Presented): The layer-2 device of claim 23, wherein said means for locating comprises:

means for receiving a neighbor packet from said next device on said port indicating a next device identifier identifying said next device; and

means for including said next device identifier in said response packet.

Claim 25 (Previously Presented): The layer-2 device of claim 23, wherein said first system is deemed to be connected directly to said layer-2 device if said first system is present on a port of said layer-2 device, wherein determining is based on the absence of reception of said neighbor packet on said port.

Claim 26 (Previously Presented): A computer readable medium carrying one or more sequences of instructions for causing a device to process a command requesting information on any intermediate layer-2 devices present in a route from a first system to a second system, said any intermediate devices being contained in a network implemented on a broadcast medium, said network containing a plurality of devices including said any intermediate devices, wherein execution of said one or more sequences of instructions by one or more processors contained in said device causes said one or more processors to perform the actions of:

receiving said command in a receiving device;

sending a request packet from said receiving device to a present layer-2 device requesting information on whether said second system is connected directly to said present layer-2 device;

receiving by said receiving device a response packet from said present layer-2 device, wherein said response packet indicates whether said second system is connected directly to said present layer-2 device, wherein said response packet further identifies a subsequent layer-2 device in a route from said present layer-2 device to said second system if said second system is not connected directly to said present layer-2 device, wherein said subsequent layer-2 device is next to said present layer-2 device in said route to said second system; and

repeating by said receiving device said sending and receiving by using said subsequent layer-2 device in the place of said present layer-2 device until said response packet indicates that said second system is directly connected to said present layer-2 device.

Claim 27 (Currently Amended): The computer readable medium of claim 26, wherein said response packet indicates that said receiving device is not ~~directly~~ connected directly to said first layer-2 device, further ~~comprises~~ comprising one or more sequences of instructions for:

locating a directly connected device which is connected directly to said first system;

using said directly connected device as said present layer-2 device, wherein said locating and said using are performed before said sending; and

performing said repeating in said receiving device to determine said route.

Claim 28 (Original): The computer readable medium of claim 27, wherein said locating comprises:

substituting said receiving device as said first layer-2 device;

third performing said repeating;

using a last one of said present-layer 2 determined by said third performing as said directly connected device.

Claim 29 (Previously Presented): The computer readable medium of claim 27, wherein said locating comprises sending a multicast packet directed to said plurality of devices, said multicast packet containing an identifier of said first system, wherein each of said plurality of devices is designed to respond indicating if said first system is connected directly to the device.

Claim 30 (Currently Amended): The computer readable medium of claim 26, further comprising one or more sequences of instructions for:

determining a first layer-2 device which is connected directly to said first system, logically viewing said first layer-2 device as a present layer-2 device if said second system is also not ~~directly~~ connected directly to said first layer-2 device;

wherein said determining, sending, receiving, and repeating are performed by said receiving device.

Claim 31 (Previously Presented): The computer readable medium of claim 30, further comprising one or more sequences of instructions for providing a command line interface to enable a network administrator to enter said command on said receiving device.

Claim 32 (Previously Presented): The computer readable medium of claim 26, wherein said second system is deemed to be directly connected to said first layer-2 device if said second system is connected to a port of said first layer-2 device.

Claim 33 (Previously Presented): The computer readable medium of claim 32, further comprising one or more sequences of instructions for:

receiving in said receiving device a neighbor packet from a neighbor device on at least one port; and

concluding in said receiving device that a system communicating on another port is connected directly to said another port by the absence of reception of neighbor packets on said another port.

Claim 34 (Currently Amended): The computer readable medium of claim 33, wherein said network is implemented using Ethernet/802.3 protocol, further comprising one or more instructions for generating ~~and~~ said request packet ~~and said response packet are generated~~ consistent with UDP/IP protocol.

Claim 35 (Previously Presented): A computer readable medium carrying one or more sequences of instructions for causing a layer-2 device to support the tracing of a route containing a sequence of layer-2 devices between a first system and a second system, said layer-2 device being comprised in a network based on broadcast medium, wherein execution of said one or more sequences of instructions by one or more processors contained in said layer-2 device causes said one or more processors to perform the actions of:

receiving in said layer-2 device a request packet from a central device, said request packet containing an identifier for said second system, wherein said request packet requests information on whether said second system is connected directly to said layer-2 device;

determining in said layer-2 device whether said layer-2 device is connected directly to said second system;

identifying in said layer-2 device a next device if said layer-2 device is not connected directly to said second system, wherein said next device is next to said layer-2 device in a route from said first system to said second system;

generating in said layer-2 device a response packet, wherein said response packet indicates whether said second system is connected directly to said layer-2 device, said response packet including data identifying said next device in said response packet if said second system is not connected directly to said layer-2 device; and

sending from said layer-2 device to said central device said response packet irrespective of whether said central device is in said route or whether said layer-2 device is a last device in said route,

whereby said central device uses said data identifying said next device to determine said sequence of layer-2 devices.

Claim 36 (Canceled)

Claim 37 (Previously Presented): The computer readable medium of claim 35, wherein said identifying comprises:

examining a table in said layer-2 device to determine a port on which said second system communicates; and

locating a device connecting on said port, wherein said located device comprises said next device.

Claim 38 (Original): The computer readable medium of claim 37, wherein said locating comprises:

receiving a neighbor packet from said next device on said port indicating a next device identifier identifying said next device; and

including said next device identifier in said response packet.

Claim 39 (Previously Presented): A device for supporting the tracing of a route containing a sequence of layer-2 devices between a first system and a second system, said device being comprised in a network based on broadcast medium, said device comprising:

an inbound interface receiving a request packet from a central device, said request packet containing an identifier for said second system, wherein said request packet requests information on whether said second system is connected directly to said device;

a next hop block determining whether said device is connected directly to said second system, said next hop block identifying a next device if said layer-2 device is not connected directly to said second system, wherein said next device is next to said layer-2 device in a route from said first system to said second system;

a generate request/response block generating a response packet, wherein said response packet indicates whether said second system is connected directly to said device, said response packet including data identifying said next device if said second system is not connected directly to said layer-2 device; and

an outbound interface sending said response packet to said central device irrespective of whether said central device is in said route or whether said device is a last device in said route.

Claim 40 (Previously Presented): The layer-2 device of claim 39, further comprising:

a memory storing a first table and a second table, said first table indicating a port on which each system communicates, said second table indicating a device connecting to each port; and

a port determination block determining a port on which said second system communicates,

wherein said next hop block examines said second table to determine said a next device according to the port determined by said port determination block, wherein said next device is contained in said sequence of layer-2 devices.

Claim 41 (Previously Presented): The layer-2 device of claim 40, wherein said next hop block determines that said second system is directly connected to a first port indicated by said first table if no device is associated with said first port in said second table.

Claim 42 (Previously Presented): The layer-2 device of claim 39, further comprising an user interface receiving a trace command from a network administrator.

Claim 43 (Currently Amended): The layer-2 device of claim 42, wherein said response packet indicates that said layer-2 device is not ~~directly~~ connected directly to said first system, said layer-2 device further comprising a control logic to trace a directly connecting device connecting directly to said first system, wherein said route is traced from said directly connecting device using said inbound interface, said outbound interface, said next hop block and said generate request/response block.

Claim 44 (Currently Amended): The layer-2 device of claim 42, wherein said response packet indicates that said layer-2 device is not ~~directly~~ connected directly to said first system, said layer-2 device further comprising a control logic to trace a directly connecting device connecting directly to said first system by sending a multicast packet.

Claim 45 (Previously Presented): The layer-2 device of claim 39, further comprising a response processor to receive a response packet, wherein said response packet indicates a next device in said route, wherein said generate request/response block generates another request packet directed to said next device, wherein said another request packet requests said next device to indicate whether said second system is connected directly to said next device.